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The American Journal of Medical Technology

JULY, 1947

Vol. 13, No. 4

OFFICIAL PUBLICATION
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AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS
Published Bi-Monthly by The American Society of Medical Technologists
Printed by The Gulf Publishing Company
Business Office: Medical Center Bldg., Lafayette, La.
Editorial Office: 2119 Arbor Ave., Houston 4, Texas
Printing Office: 3301 Buffalo Drive, Houston 6, Texas

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The
AMERICAN JOURNAL
of
MEDICAL TECHNOLOGY

VOLUME 13 JULY, 1947 NUMBER 4

PENICILLIN AND STREPTOMYCIN SENSITIVITY OF MISCELLANEOUS BACTERIA AND FUNGI*

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With the introduction of the antibiotics, penicillin and streptomycin, it becomes of greater importance than ever before to make a bacteriological diagnosis in an infection. For in addition to the sulfonamides, there exist these two powerful agents for therapy, and the choice of which to use and how much to use can only be determined in the laboratory.

We have not attempted to collect figures which would be of statistical value. Most of our determinations were done when the actual need arose to know the sensitivity properties of an organism.

This paper offers data on two points:

1. Additional[1,11] evidence that sensitivity tests are necessary for treatment guidance especially in endocarditis.
2. Sensitivity determinations on a few of the pathogenic fungi and uncommon bacteria on which little information exists.

Methods for Testing for Sensitivity to Penicillin and Streptomycin

Penicillin Sensitivity Tests

Start with saline solutions containing:

1000 units per cc. of penicillin.
100 units " " " "
1 unit " " " "

To sterile Petri dishes add:

0.25 cc. of 1 unit	per cc. for final conc. of	.012 u/cc.
0.5	"	.025	"
1.0	"	.05	"
2.0	"	.1	"

* First Award Paper, read before A.S.M.T. Convention, Denver, Colorado, June 1947. Also read before Texas S.M.T. Convention, April 1947, First Award in State Paper-writing Contest.

.05	cc. of	100 units per cc.	for final conc. of	.25 u/cc.
.1	"	"	.5	"
.2	"	"	1.0	"
1.0	"	"	5.0	"
.2	1000 units		10.0	"
.4	"	"	20.0	"
.8	"	"	40.0	"

Add 20 cc. of blood agar to each dish, measuring with a sterile pipette, and mix by stirring with a sterile pipette or rod. Do not flame to remove bubbles. For routine work we use only plates containing concentrations of .025, 0.1, 0.5, 1.0, and 5.0 units per cc. of penicillin. Inoculate the plate by making a streak of the unknown culture on one area of the plate. Either a broth culture or an agar culture may be used, but the broth is much to be preferred (broth or meat). As many as ten cultures may be inoculated on one series of plates. The organisms tested must be in pure culture. Each time a sensitivity test is run, a control organism, whose sensitivity is known, should be run also. A control plate, without any penicillin, is always inoculated in each series to test for growth. Diluted penicillin will keep for one week in the refrigerator.

Streptomycin Sensitivity Tests

Start with a solution containing 1000 units per cc. of streptomycin. Diluted streptomycin will keep for two weeks in the refrigerator. The technic is the same as for penicillin sensitivity tests.

To sterile Petri dishes add:

0.1	cc of	1000 units per cc	for final conc. of	5 u/cc
0.2	"		"	10
0.4	"		"	20
0.8	"		"	40

Strains of E. coli or Salmonella may be used as controls. A very sensitive organism is inhibited by 5 units by this method. A control plate, without the antibotic, is always inoculated in each series to test for growth. Both penicillin and streptomycin plates must be dried by placing in the incubator for a few minutes with lid ajar before using.

Thirty strains of E. coli tested by this method were inhibited by 5 units but not by much smaller amounts; hence 5 units per cc. was the lowest concentration used in routine testing. It might be advisable to use a special Difco streptothrycin assay agar. Undoubtedly streptomycin would prove more potent in such a medium.

Staphylococci

It has been demonstrated many times[5] that there is no correla-

tion between pathogenicity and sensitivity to penicillin. The smaller number of strains which we examined are in accordance with this as well as showing a similar condition for streptomycin sensitivity. See Table I.

The most note-worthy fact about the staphylococci here discussed is that there were three resistant strains which proved to be the cause of serious infections. One of these was isolated from a case of severe sore throat which later caused the death of the patient with endocarditis as a complication. Both the staphylococcus from the original throat culture and from the heart valves required a whole unit of penicillin for inhibition. The strain isolated from the heart constitutes the second resistant strains in our series. There was no streptomycin available at that date, but later testing has shown that this organism is also resistant to streptomycin, requiring between 10 and 20 units for inhibition.

The third strain was the causative organism in a fatal post-abortion septicemia. This required 10 whole units of penicillin per cc. for inhibition in vitro. Streptomycin was not available, and this strain, which we have labeled strain T, was only recently checked for its reaction to streptomycin. It proved to be highly susceptible.

In both these patients there was evidence that the resistant cocci had acquired their fastness under therapy with the antibiotic. It has been found[5,14] that 12% of pathogenic staphylococci are naturally resistant and that about another 10% acquire resistance during treatment.[5]

It would be a fortunate thing if the majority of penicillin-resistant cocci were streptomycin sensitive. As will be brought out below in relation to alpha hemolytic streptococci, our small series suggests that a penicillin-resistant organism is only occasionally streptomycin sensitive. However, the case with Staphylococcus T. illustrates how important it is to look for streptomycin sensitivity in problem cases which have penicillin resisting bacteria. See Table I.

Alpha Hemolytic Streptococci

The twenty-three strains tested are remarkable for the degree of variation in reaction to both penicillin and streptomycin. As Table II illustrates, thirteen resistant strains were encountered. Of these, seven were resistant to penicillin in moderate doses. It is interesting to note that only two of such penicillin-resistant strains were inhibited by streptomycin.

Strains were predominantly from sputa of patients with chronic bronchitis. Five, however, were from blood cultures. Of these blood culture strains, four were resistant to both antibiotics.

TABLE I

Number of Strains of Each Organism Completely Inhibited by Antibiotics

	PENICILLIN						STREPTOMYCIN			
	.025	0.1	0.5	1.	5.	10.	5	10	20	40
Alpha hem. strep.	5	9	3	2	2		3	5	5	4
Not classified					1*					3*
Strep fecalis			1		1					2*
Staph. aureus	1	6		4 1*	1	1	5	2	2	1
Staph. albus	2		1				2	1		
Micrococcus, not classified		2	1		1		2	1		
K. Friedlander Type B						1*		1		
K. Friedlander not typed					1*		1			
K. Rhinoscleromatis						not by 40 units	1			
Bacillus group		1	1		1*			2	1	
Non-hem. strep.		1			1*					1*
Pneumococci	2	1*					1		1	1*
N. catarrhalis			1						1	
N. sicca			1					1		
Beta hem. strep.	2	2					2	1	1	
Bacteroides				1			5			
Nocardia, acid-fast					1*		1			
Nocardia, not acid-fast				1		not by 40 units	1			1
Geotrichium immite					1*					1*

* Not inhibited by this concentration and not tested in higher amounts.

One was not complicated by endocarditis and convalesced without penicillin or streptomycin. One case is under treatment at the present time. Two strains, which were streptococcus fecalis, were isolated from a single case of sub-acute bacterial endocarditis. We speak of two S. fecalis strains: 1. the strain isolated before therapy was inhibited by 0.5 unit of penicillin per cc., and 2. the strain isolated during treatment, required 5 whole units per cc. Sterilization of blood stream was finally accomplished when a combination of phage, 10-12 million units per day of penicillin, and sodium benzoate by mouth were administered. The patient's penicillin blood level showed 4 to 5 units per cc.

The observation that Streptococcus fecalis is penicillin resistant has been made by many workers including Rorimer[13] and Garrod.[1]

TABLE II

Comparing Penicillin and Streptomycin Sensitivity in Resistant Gram Positive Cocci

Penicillin resistant and streptomycin resistant.....7 strains
Penicillin resistant and streptomycin sensitive.....2 strains
Penicillin sensitive and streptomycin resistant.....4 strains

Non-Hemolytic Streptococcus

One culture was from a case of acute endocarditis. It was sensitive in vitro and responded well clinically to penicillin.

Pneumococci

Since penicillin resistant pneumococci are rare,[12] it is a strange coincidence that in our three tested a resistant strain was found. It came from the sputum of a patient with chronic bronchitis who had received penicillin but never streptomycin. It was also highly streptomycin resistant.

A second strain tested from a case of pneumonia proved sensitive to penicillin but resistant to streptomycin. See Table I.

The third strain was from a case of meningitis. It proved sensitive to both streptomycin and penicillin.

Gram Negative Cocci

In the Neisseria group only two strains were tested, one of N. catarrhalis and one of N, flavus. They were not sensitive to penicillin and were not especially sensitive to streptomycin. See Table I.

Beta Hemolytic Streptococci

Four strains were examined. Two of these, although sensitive to penicillin, were not in the expected[12] range of extremely high sensitivity. Both patients had received penicillin before the cultures were taken.

Bacteroides

Only one member of this group was tested, a bacterium from a lung abscess. It was highly resistant to penicillin, sensitive to streptomycin.

Friedlander (Klebsiella) Group

Friedlander B. This bacterium was of clinical importance because it was isolated from a case of osteomyelitis which was refractory to penicillin therapy. As would be expected, the organism was resistant to penicillin.[1, 7, 8]

Friedlander untyped. This was a mouse-pathogenic strain isolated from the diarrhetic stool of an infant. Again it was sensitive to streptomycin, insensitive to penicillin.

Rhinoscleroma. A Klebsiella rhinoscleromatis from a typical case of rhinoscleroma showed sensitivities similar to the other members of this genus. See Table I.

F. R. Heilman[7] has studied pathogenic Friedlander bacilli: strains which could be typed, unclassified types, and also a strain of rhinoscleromatis.[9] Both in vitro and in vivo studies demonstrated the streptomycin sensitivity of this group.

Bacillus Group

This consisted of rods found in sputum specimens. They were included when sputum was tested, for the sake of completeness. No attempt was made to determine whether they were contaminants or actually were excreted by the patient.

E. Coli

A total of 32 strains of E. coli, mostly isolated from stool specimens, were examined. These were all inhibited by 5 units per cc. of streptomycin, showing remarkable uniformity. Only two of these were checked against penicillin and were highly resistant.

Paracolons

Seventeen strains were all inhibited by small concentrations of streptomycin. See Table III. However, two strains showed some definite resistance to 5 and 10 units in contrast to the more uniform sensitivity of E. coli and Salmonella.

The Paracolon "navy" strains are of especial interest because of their possible pathogenicity. In 1946, Commander L. A. Barnes[2] studied an outbreak of diarrhea in the Navy in which a certain paracolon was present in the majority of stools. We have isolated this species from several babies with diarrhea and from one gallbladder specimen.

E. typhi

These two cultures show good sensitivity to streptomycin. One strain is from a blood culture; the second is from the stool of a woman who had typhoid fever forty-seven years ago.

The Proteus Group

The proteus group is represented by just two members, a Morgan's bacillus and an unclassified proteus, both of which were highly streptomycin sensitive.

The Shigella Group

The bacteria consisted of four species: a strain of Shigella sonne, Shigella flexner Type II, Shigella dispar, and Shigella alkalescens. Refer to Table III.

TABLE III

Sensitivity of Gram Negative Rods to Streptomycin

	No. of Strains	Control (No Strepto-mycin	Units per cc.			
			5	10	20	40
Paraco'on (non specific)	10	4+ growth	none or sl.	none or sl.	none or sl.	none or sl.
Paracolon (non specific)	2	4+ growth	+ or++	slight or +	none	none
Paracolon "navy"	4	4+ growth	none or sl.	none or sl.	none	none
Pyocyaneus	1	4+ growth	4+	4+	4+	4+
E. typhosus	2	4+ growth	none or 1 +	none	none	none
Proteus	2	4+ growth	slight	slight	slight	slight
Shigella	4	4+ growth	none or sl.	none	none	none
Salmonella	13	4+ growth	none or sl.	none or sl.	none or sl.	none or sl.

Pseudomonas pyocyaneus

One strain of Pseudomonas pyocyaneus was tested. This proved to be highly resistant to penicillin and streptomycin.

Coccidoides Immitis

One freshly isolated strain grew through high concentrations of both antibiotics.

Geotrichium Immite

The Geotrichium tested was a strain isolated from the blood of a seven weeks old infant, two days before the child's death. Wright stain smears of the blood showed numerous oval budding yeasts, a few oblong forms and a few mycelia. A heavy growth of the yeast occurred in meat cultures and on dextrose and Sabourauds slants. Although an autopsy was performed, it was difficult to judge how much pathology had been caused by the Geotrichium since miliary tuberculosis was present with its typical gross and microscopic changes and with acid-fast rods in sections of the tissues.

Table I illustrates that this yeast was not at all sensitive to the action of penicillin or streptomycin.

Other pathogenic yeasts whose sensitivity to penicillin has been studied include C. hominis,[8,9] Monilia albicans,[8] and Bastomyces dermitidis.[9] Of these, only one strain, a C. hominis, examined by Hobby, Meyer, and Chaffee,[8] was inhibited by the antibiotic.

Nocardia Asteroides

Strain No. 1 was isolated from a case of lumpy jaw in a

rancher. Actinomyces bovis had been anticipated. This was the first Nocardia we had isolated and we could only speculate concerning what its sensitivities might be. We rather expected it to respond to penicillin in accordance with the characteristics of Actinomyces bovis.[1, 4, 6, 9] We did not anticipate sensitivity to streptomycin in view of the fact that streptomycin is a product of a Nocardia. Thus we were surprised at the findings. See Table I.

Strain No. 2 was isolated from an abscess of the hip. The culture was made from a small piece of tissue removed when the abscess was opened for drainage. Thus the chances of the organism being a contaminant were slight which would not have been true had an open lesion existed. The patient has had two such abscesses which leave chronic draining sinuses. This is to be expected in view of the fact that the pathogenesis of Actinomyces bovis and Nocardia asteroides are indistinguishable.

In direct smears of the abscess, filaments typical of the actinomyces group were seen. The culture grew out rapidly with small grey shiny dome-shaped colonies on blood agar. On Petragnani's and dextrose slants the colonies were dark grey, rough. This strain differs from the other two described in having a very penetrating earthy odor and in being acid-fast. All three strains have a greyish-white colony in very young cultures, but this is the only strain which keeps its grey color; the other strains become yellow or deep orange.

As the first strain isolated, this organism is sensitive to streptomycin, resistant to penicillin.

Strain No. 3 appeared in the thioglycollate broth culture of a bloody pleural fluid. No other organism accompanied it. A culture with similar characteristics was found from the patient's sputum growing on dextrose agar slants. Unfortunately, this strain did not show inhibition by either streptomycin or penicillin.

Kirby and McNaught[10] have prepared an excellent review of Nocardiosis. They found reports of 32 cases, 28 of which died. They record a penicillin sensitivity test done on one strain, with the result that the organism was not influenced by penicillin.

DISCUSSION

The necessity of determining an organism's sensitivity cannot be overrated, especially in septicemias, with or without endocarditis. A septicemia, or other type of infection, hopeless from the standpoint of penicillin may be easily controlled with streptomycin or vice-versa. Secondly, a resistant organism may be developed in the patient in 24 to 48 hours if an insufficient amount of either antibiotic is administered.

In the present time, with scarcity of hospital space, a physi-

cian frequently must start treatment before he obtains a hospital bed for his patient. The only solution to this problem is blood cultures taken at home *before* the first dose of penicillin or streptomycin. Once therapy is started, the blood stream may be intermittently sterilized and although treatment may be unsatisfactory, a positive blood culture may be hard to obtain.

Blood cultures are best taken into duplicate bottles of medium. Duplication helps to determine whether an organism recovered is significant or merely a chance contaminant. Penicillinase should be added before taking the culture if the patient has been receiving penicillin; the amount of penicillinase added varying with the amount of penicillin being received by the patient. This, of course, serves the purpose of inactivating the penicillin existing in the blood sample drawn. However, it naturally cannot revive bacteria which have already succcumbed to penicillin action and the need for taking cultures before antibiotics are administered still exists.

It is often thought that a blood culture or any other bacteriological procedure is an expensive item. Such costs, however, are insignificant in comparison with an additional period of hospitalization which may be saved by an informative culture.

CONCLUSIONS

1 Variation is great in the gram positive cocci, especially in the alpha hemolytic streptococci.

2. A gram positive coccus, resistant to penicillin, may be streptomycin sensitive and should always be tested for this possibility. However, such a variation seems to be the exception rather than the rule.

3. The gram negative rods, E. coli, Proteus, E. typhosus, Paracolon, K. friedlander, and K. rhinoscleronatis, were all sensitive to streptomycin. A single strain of Pseudomonas pyocyaneus was resistant.

4. Three types of fungi were tested: Coccidioides immitis, Geotrichium, and several strains of N. asteroides. Coccidioides immitis and Geotrichium were highly resistant to both antibiotics. Two strains of N. asteroides were sensitive to streptomycin.

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PARASITOLOGICAL PROCEDURES FOR THE MEDICAL TECHNOLOGIST*

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Before the medical technologist can identify the various parasites, she must obtain proper specimens and use efficient procedures of recovery. This paper deals only with the specimens to be examined, parasitological procedures and references. The morphological details of human parasites may be found in the listed references.[1-9]

Feces
Suggestions for Examination

Feces are examined for trophozoites and cysts of protozoa, eggs and larvae of helminths, adult flukes, adult round worms, scolices and proglottids of tapeworms. It is of great importance that a fresh, warm stool be examined if searching for trophozoites of protozoa. Loose stools may be stored in a 37° C. incubator up to 30 minutes, and formed stools in a refrigerator for several days. In parasitological examinations, it is best to examine the stool as soon as possible after passage. The feces should not be mixed with water, urine, oil or preservatives. A gross examination for blood, mucus, mature worms, and tapeworm segments should be performed. The microscope should be calibrated and equipped with a mechanical stage so the preparation can be systematically surveyed under low power, and the high dry lens used for verification.

Fecal Parasitological Procedures

Temporary fecal preparations consist of saline, iodine and Quensel's preparations for the detection of trophozoites, cysts, eggs and larvae. Direct saline mount[1] should always be examined first, and indicates if further examination is necessary. A few minutes are allowed before examining for the trophozoites to settle and become motile. Gently touching the coverslip may cause the parasite to change position showing a more characteristic shape or structure. The addition of iodine solutions[1,4] bring out the nuclei and glycogen of the protozoan cysts. Five minutes are usually allowed for the iodine to penetrate the cysts. Quensel's solution[10,11] after 10-20 min., stains the nuclear chromatin of the amoebae trophozoites dark blue or black. The cysts do not stain. Quensel's stain is prepared as follows:

"(1) Decant 20 cc. of a saturated solution of Sudan III in 80% ethyl alcohol.

* Read before A.S.M.T. Convention, Denver, Colorado, June, 1947.

(2) Mix with 30 cc. of a saturated and filtered aqueous solution of methylene-blue (Medicinal).
(3) Filter mixture into 50 cc. of a 10% aqueous solution of *cadmium chloride* (c.p. for scientific purposes).
(4) Gently shake now and then for 15-20 minutes (a voluminous flocculent precipitate appears and the fluid becomes almost colorless).
(5) Filter.
(6) Remove liquid from precipitate by placing the filter paper with the precipitate upon another filter paper or cellulose wool. Leave overnight.
(7) Transfer precipitate to a fresh filter and pass rapidly through 25-30 cc. of distilled water.
(8) Dissolve the washed precipitate in 250 cc. of distilled water.
(9) Filter in a few days if fine crystals of cadmium chloride precipitate."[11]

A tap water preparation[12] is useful to destroy *Blastocystis hominis* and to identify *Dientamoeba fragilis*.[13]

Permanent hematoxylin stained preparations using rapid staining techniques[3,4,14] are sometimes useful for detailed morphological study of the intestinal protozoa.

Cultural methods[1,3,4,15] can be used to study protozoan trophozoites and to increase their number. Sterile media and a large inoculum of feces should be used. Cultures should be examined and subcultured at the end of 24 hours, and again after 48 hours. It is best to use one medium constantly rather than to change from one to another.

Protozoan cysts, helminth eggs and larvae can be concentrated by the modified zinc sulfate centrifugal flotation procedure.[4,16] Trophozoites, operculated eggs and schistosome eggs are destroyed, distorted or not recovered. The use of zinc sulfate, sp. gr. 1.20, is suggested for formalized specimens.

The Willis-Mallory brine flotation procedure[1,5,17] concentrates helminth eggs, other than operculated and *Schistosoma*. Cysts are unrecognizably shrunken.

For the concentration of all eggs, particularly operculated and *Schistosoma*, the sodium sulfate-triton-ether procedure[18] is recommended. Cysts are not recovered. The sodium-sulfate-triton-ether procedure is as follows:

1. Using two applicator sticks, remove a sample of feces about the size of a pea (approximately 1 gram). If schistosomiasis is suspected, try to secure this entire sample by scraping the outer surface of the stool specimen.
2. Place feces in a test tube or vial containing 5 ml. of Na_2SO_4 (sp. gr. 1.08) and 0.06 ml. of triton NE.
3. *Comminute* the feces thoroughly with the applicators, forming a homogeneous suspension.

4. Strain 5 ml. of the suspension through two layers of *wet* cheesecloth or gauze contained in a 50 mm. diameter funnel, into a 15 ml. graduate centrifuge tube.
5. Add an equal quantity of ether.
6. Insert a rubber stopper and shake thoroughly for about one minute.
7. Remove the stopper, place the tube in the centrifuge and spin for two minutes at 1500 r.p.m.
8. The interphase film between the ether and aqueous reagents is carefully stirred with an applicator stick.
9. Decant supernatant fluid.
10. Transfer sediment to a 3" x2" slide.
11. Place a coverslip on the material and examine under low power for eggs. Confirm findings under high dry.

Cysts, eggs and larvae may be obtained in a viable condition by centrifugation and sedimentation.[1,4]

In regions where hookworm is common, a Stoll egg count[1,4,19] may be done to determine the degree of infection or the worm burden.

Recovery of adult worms, segments and scolices is accomplished by straining[1,5] through graded sieves. Segments can be cleaned in 70% carbolic and 25% xylol to bring out the lateral uterine branches.

Pinworm, *Enterobius vermicularis*, eggs are best recovered by swabbing the perianal regions with scotch tape[20] or N. I. H. swab.[1,4,21]

The recommended procedures for routine stool examinations are a gross examination, direct saline and Quensel's stain preparations and the use of iodine solution on a modified zinc sulfate centrifugal flotation concentrate. If the patient has been in a trematode endemic area, the sodium sulfate-triton-ether technique may reveal fluke eggs, but is not recommended as a routine procedure.

Blood Parasitological Procedures

Blood preparations are examined for malaria, trypanosomes, leichmaniae and microfilariae. Permanent blood preparations may be either thick or thin films. In making both films absolutely clean slides should be used. Thick blood films[1,4,22] are stained unfixed in dilute Giemsa stain for 45 minutes. Surveying with 5x oculars under oil immersion should be begun at the thin outer edge and proceed to the thicker inner portion for a period of 5 to 10 minutes or until 100 fields have been examined. Thin fixed blood films[1,22] are stained in the same manner and examined under oil immersion for 30 minutes or until 100,000 cells have been scanned. Wright's stain is not recommended for staining malarial parasites and differentials should not be done on Giemsa-stained slides.

The presence of eosinophils on the thin film should be noted as

they are increased in some parasitic diseases, but are most marked in trichinosis after the tenth day.

Temporary wet blood preparations are useful in detecting motile trypanosomes and microfilaria.

Trypanosoma cruzi can be cultured from the blood on Kelser's medium[3,23] and on N. N. N. medium.[1,3,4,24] Blood, aspirated ulcerous material and tissue punctures suspected of *Leishmania* can be cultured on N. N. N. medium.

If malaria and trypanosomes cannot be detected by thick blood films, concentration procedures[1,4] can be performed. Knott's technique[25] can be used to concentrate blood microfilaria. Periodicity of certain microfilaria should be kept in mind.

The recommended procedure for the diagnosis of malaria is a 5 to 10 minute examination of a Giemsa-stained thick blood film under oil immersion. If *Leishmania* and trypanosomes cannot be diagnosed on direct examination of the blood, aspirated tissue fluids or gland puncture, cultivation should be attempted. Thick blood films stained with dilute Giemsa stain will often show microfilaria.

Urine Parasitological Procedures

The sediment of the first portion of urine voided is examined for motile trophozoites of *Trichomonas vaginalis*, and the last portion for eggs of *Schistosoma haematobium*.

Vaginal Parasitological Procedures

Direct unstained saline preparations of vaginal secretions are examined for motile trophozoites of *Trichomonas vaginalis*. If the latter are found on G. C. smears, they should be reported.

Sputum Parasitological Procedures

The operculated eggs of the lung fluke, *Paragonimus westermani*, are detected in unstained saline preparations of sputum.

Tissue Parasitological Procedures

From the 5th to 10th day after ingestion of uncooked meat, the muscle tissues are teased for recovery of uncoiled larvae of *Trichinella spiralis*. A muscle biopsy examined by compression[1,26] after the 17th day should reveal coiled trichina larvae. Rectal biopsy tissue[27] has proved useful in the recovery of *Schistosoma mansoni* eggs. Tissue juices are aspirated from the nodules for detection of microfilaria of *Onchocera volvulus*, and from indurated margins of ulcers, the leishmania forms of *Leishmania tropica* and *L. braziliensis*.

Skin Tests

Cutaneous tests have been devised for diagnosis of trichinosis,[4,28,29,30] echinococcus,[4,31,32] and schistosomiasis.[33]

No attempt has been made to give all the known parasitological

procedures, but merely to mention those which are considered of practical importance in diagnostic work, taking into consideration time, expense, inconvenience to the patient and possibilities of detecting the various morphological forms of parasites likely to be encountered in various specimens. Directions for performing the suggested procedures can be found in other sources than those cited. Reference has been made to the original journal articles and to books found in the hospital library. The details for preparation of Quensel's stain and for performing the sodium sulfate-triton-ether procedure have been given because of the inconvenience to the medical technologist in referring to these journals.

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METHOD FOR HISTOLOGICAL PREPARATIONS FROM ASPIRATED "STERNAL MARROW UNITS"

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The increasing demand for histological preparations of sternal marrow units is proposing to the medical technologist the task of selecting a method that yields sections suitable not only for topographic but also for research purposes.[1] The methods published by Berman[2] and Mertens[3] were given a careful trial in our laboratory but the marked tendency of either technique to produce artifacts because of the slow penetration of fixing fluids through the plasma or blood clot induced this writer to publish a modification of a procedure that has been used for several years in our laboratory.[4] Sections made according to the technique described below are (a) free of gross artifacts and (b) fine morphological detail is retained which needless to say is the essence of a good histological preparation.

Technique

The "marrow units," obtained by aspiration-biopsy which may range from less than 0.5 mm. to more than 4 mm., are placed into a Petri dish containing a fixing fluid which consists of 10 cc. of neutral 40 percent formaldehyde and 90 cc. of 0.9 percent sodium chloride solution. Magnesium carbonate, when used for the neutralization of formaldehyde, and the formaldehyde should be of C.P. quality. The units are transferred with a medicine dropper into another Petri dish containing fresh fixing solution. This step is repeated until the units are free from blood. The marrow tissue may remain in the fluid from several hours to overnight. During the dehydration procedure, the units may be kept in a 25 cc test tube and the fixing fluids and alcohols may be poured off the units which generally remain at the bottom of the tube. In case the units float on the top of the fixing fluid, the contents of the test tube are poured into a Petri dish. The units are then picked up and transferred with a medicine dropper to a dish containing 50 per cent alcohol. There they remain for one hour. Then the units are placed in 75 per cent and 85 per cent alcohols for one hour each. Then they are transferred to 95 per cent alcohol for 30 minutes and absolute alcohol for 15 minutes. From the absolute alcohol, the units are placed into acetone, xylol, or dioxane for 15 minutes. The acetone, xylol, or dioxane should be changed at least once to assure complete elimination of the alcohol. If the units are allowed to remain in the absolute alcohol or acetone, particularly the latter, for longer than 15 minutes, the marrow units will become hard and brittle and are thus

very difficult to cut. The units are now transferred to a 50 cc. beaker which contains paraffin heated to 58° C. The units are picked up with the medicine dropper and expelled with sufficient force into the melted paraffin to assure complete submerging of the units to prevent the possibility of drying. Then the units are allowed to remain in the paraffin for 2 to 3 hours, or overnight, at 58° C.

For the removal of the units from the paraffin, a medicine dropper with the pointed end cut off is slightly heated and the units are then transferred from the paraffin to a small paper boat, which has been partially filled with new melted paraffin. Care should be taken in heating the glass tube in order to prevent burning of the units by excessively heated paraffin. With a heated small glass or metal spatula, the units are heaped up in the center of the boat and the boat is now placed on the surface of cool water to bring about a quick hardening of the bottom to prevent dispersion of the units. The paraffin is then allowed to harden at room temperature.

The paper is removed from the paraffin block and the paraffin is trimmed in such a way that about 2 to 3 millimeters of paraffin is left on each side of the aggregate of units. The paraffin block is mounted and cooled by placing the block on ice cubes. It is imperative that the sections are made with a freshly honed and stropped microtone knife in order to get perfect sections which should be about 5 to 6 microns thick. The sections are mounted serially on chemically cleaned microslides which have been previously treated with the routine egg albumin-glycerine mixture. Due to the smallness of the unit sections, they dry quickly in an oven at 37° C. or incubator and can be stained after 3 hours.

The treatment of the sections is as follows:

1. Xylol .....5 minutes
2. Xylol .....5 minutes
   (It is important that the xylol is frequently changed in order that the chemical may remove the paraffin completely to prevent a paraffin film from being carried over which will interfere with proper staining of the sections.)
3. Absolute alcohol .....5 minutes
4. Alcohol 95 per cent .....5 minutes
   (Again the alcohols which remove the xylol should also be frequently changed because failure to do so will lead to spotted staining.)
5. Alcohol 80 per cent .....5 minutes
6. Distilled water (two changes) .....3 minutes each
   (The distilled water should be changed daily to prevent contamination of the hematoxylin.)
7. Harris Hematoxylin .....1 minute
8. Running tap water .....rinse well

9. Acid-alcohol* .....until sections take on a salmon color (several seconds)
10. Running tap water .....wash well for several minutes
11. Ammoniated water .....until sections are blue
12. Running tap water .....5 minutes
13. Alcohol 80 per cent .....5 minutes
14. Eosin (alcoholic) ..several seconds (depending on strength used)
15. Alcohol 80 per cent .....rinse well
16. Alcohol 80 per cent .....rinse well
17. Alcohol 95 per cent .....1 minute
18. Absolute alcohol .....1 minute
19. Absolute alcohol and xylol equal parts.....5 minutes (The absolute alcohol-xylol clearing mixture is more efficient than the various oils used in many laboratories.)
20. Xylol .....1 minute
21. Xylol .....1 minute
22. Xylol .....1 minute or longer
23. Coverslip. Using Clarite and #0 or #1 coverslip.

Summary

A method for the preparation of aspirated "sternal marrow units" for histological purposes is presented. Sections made according to this procedure are superior to those made from units which are enclosed in a blood or plasma clot.

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* 70 per cent alcohol, 99 cc. Concentrated hydrochloric acid, 1 cc.

AN IMPROVED TISSUE TECHNIQUE WITH HEMATOXYLIN-EOSIN STAIN*

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"The ideal function of the techniques of pathological histology is so to fix tissues for microscopic examination that every tissue element and pathological product is perfectly preserved with all its morphological and chemical properties intact, and so to stain tissues that the various structures can be readily differentiated from each other."[1]

In the average laboratory, which is usually too busy to attempt more than one routine or a very few differential stains, the technique employed should be one that is uniform, sufficiently rapid and adequate. I should like to outline and comment on the method which we have been very satisfactorily using for the past year.

As the time element is very important in making tissue reports available to the surgeon at the earliest possible date, the use of the Autotechnicon has been an outstanding factor in the preparation of tissues for paraffin embedding. As there are almost as many variations in dehydrating technics as there are pathologists and technicians, any satisfactory one can be used. We have been using formalin or acetic-acid-formalin fixation, alcohol and acetone dehydration and xylol for clearing.

The chief variation in the technic we employ is the addition of a layer of calcium chloride about ¼-in. thick[2] on the bottom of each beaker, beginning with the one containing absolute alcohol and continuing through the xylol-paraffin mixture—in other words, the calcium chloride is added to each container that should not contain water. When the layer of calcium chloride becomes almost completely liquefied from absorbed water, the solution is changed. This makes complete dehydration more certain and uniform. Solutions can be used for a much longer time.

The tissue sections are placed in the first formalin solution. The first change is made into the second formalin solution at 7 p.m., with hourly changes until the technician is ready to embed the tissues the following morning about 8 or 8:30 a.m.

Technic for Use With Technicon

1st beaker	Formaldehyde 10%	4 hours—starting about 3 p.m.
2nd beaker	Formaldehyde 10%	1 hour
3rd beaker	Ethyl alcohol 95%	1 hour
4th beaker	Ethyl alcohol 95%	1 hour

* Read before the Pennsylvania Society of Medical Technologists and Laboratory Technicians, May 1947.

5th beaker	Absolute alcohol	1 hour
6th beaker	Absolute alcohol	1 hour
7th beaker	Absolute alcohol and acetone 50/50	1 hour
8th beaker	Xylol and acetone 75/25	1 hour
9th beaker	Xylol	1 hour
10th beaker	Xylol-paraffin 90/10	1 hour
11th beaker	Paraffin #1	1 hour
12th beaker	Paraffin #2	2 hours

Embed.

The 5th to 10 beakers inclusive have a ¼-inch layer of calcium chloride in them.

The embedded blocks are placed in cold water, or on ice, to harden them before cutting. Sections are then fixed to the slides in the paraffin oven. After taking the slides from the oven, they should be cooled to room temperature before starting the staining process.

Most laboratories employ a hematoxylin-eosin technic for the routine stain. There have always been variable results obtained with the use of the hematoxylin-eosin stain. This resulted from various degrees of decolorization and differentiation, overstaining or understaining, variable chemical characteristics of the tap water used in washing and other factors.

The method used here has been described by Dr. E. E. Ziegler in the Archives of Pathology January, 1944.[3] With this method, differentiation is made by employing a 2% phosphotungstic acid solution made up in normal saline solution, followed by a 2% normal saline solution wash. The phosphotungstic acid differentiates the hematoxylin stain to the right degree and then stops. This prevents excessive decolorization. The slides are now put in 2% sodium citrate solution which neutralizes the phosphotungstic acid left in the tissues. It also conditions them so as to receive the right amount of eosin stain.

The only variables are the time intervals in the hematoxylin and eosin stains used. These intervals are adjusted after running through a few trial sections.

Harris', Delafield's or a satisfactory modification of their hematoxylin formulas are suitable. One should not add acetic acid to these stains. The timing of the hematoxylin can be regulated to accommodate the need of the pathologist for a lighter or darker staining of the nuclear elements. Acid hematoxylin does not give good results. A properly ripened stain gives good results at about 5 minutes.

A fairly strong solution (5%) of eosin is used. It would be more satisfactory to weaken or strengthen the solution rather

than attempt to vary the density of the contrast stain by changing the timing.

The entire staining procedure should be carried out by accurate timing as stated, rather than by checking the results visibly. The staining technic should take about 12 to 15 minutes exclusive of mounting. When dipping the slides in and out of the solutions, a slow even, unhurried motion should be used.

Covered staining jars should be employed which will hold racks containing 10, 20, or 30 slides, according to the number routinely stained at one time. Jars should be kept covered when not in use to prevent evaporation. Solutions of saline should be changed daily. The others can be added to and the alcohols and xylols can be shifted to conserve them. Separate dishes should be used for each step.

With this technic the following results are obtained: nuclei, blue to purple; cytoplasm, pink to lilac; muscle tissue, lavender; fibrous tissue, pink; elastic lamina of blood vessels, brilliant pink; nerve tissue, light greyish purple. Fibers of all kinds are well stained. Necrotic substances stain various shades of purple or pink. The technic gives a very good contrast between the blue-purple shades and the pink shades of the counterstain. At the same time there is a greater range of tinting of the various elements of the tissue. The staining results are very uniform and can be duplicated repeatedly until the stains and solutions get too old.

Staining Technic

After cutting sections and fixing them on slides stain as follows:

1. Dip 8 times in Xylene #1.
2. Dip 8 times in Xylene #2.
3. Dip 8 times in absolute alcohol #1.
4. Dip 8 times in absolute alcohol #2.
5. Dip 8 times in 95% alcohol.
6. Dip 8 times in normal salt solution.
7. Stain in properly ripened alum hematoxylin 3 to 8 minutes as desired.
8. Dip 8 times in normal salt solution.

8a. Dip 4 times in normal salt solution (optional).

9. Dip 4 times in 2% solution of phosphotungstic acid in normal saline.
10. Dip 8 times in normal saline.
11. Dip 4 times in 2% sodium citrate in normal salt solution.
12. Dip 8 times in normal saline.
13. Counterstain for 2 minutes in 5% solution of eosin in a 50% mixture of ethyl alcohol and distilled water. (Stronger or weaker eosin may be used as desired.)

14. Dip 8 times in 95% alcohol.
15. Dip 8 times in absolute alcohol #1.
16. Dip 8 times in absolute alcohol #2.
17. Dip 8 times in xylene # 1.
18. Dip 8 times in xylene #2.
19. Mount in neutral medium (clarite).

Modified Delafield's Hematoxylin

1. Dissolve 2 grams hematoxylin in 15 c.c. 95% alcohol.
2. This solution (#1) is added to 200 c.c. 15% aqueous ammonium alum.
3. Add 15 c.c. hydrogen peroxide (Peroxide should come from a freshly opened bottle). Shake to mix.
4. Add 50 c.c. 95% alcohol.
5. Add 50 c.c. glycerin.
6. Add small crystal of thymol.
7. Allow to stand overnight. Filter and stopper.

This solution is now ready for use.

Summary

1. A routine technic for paraffin sections with hematoxylin and eosin staining is given.

2. The dehydration process employs calcium chloride to conserve solutions and to insure proper dehydration.

3. An improved Hematoxylin and Eosin staining technic is given which will give identical results in the hands of any technician.

4. A formula is given for a modification of Delafield's Hematoxylin which can be used immediately after being made, hydrogen peroxide being used for "ripening."

Grateful appreciation is due Dr. Edwin E. Ziegler for use of material and helpful suggestions in making this report.

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MODIFIED STAIN FOR USE WITH ACID-FAST SMEARS

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In the microscopic examination of sputum for tubercle bacilli content, the five-day concentration and Ziehl-Neelsen techniques are widely employed for staining the smears. These methods are not only time-consuming in preparing the sputum, but the microscopist is required to spend considerable time in isolating and identifying individual bacilli in specimens which appear to have a low incidence. It is not uncommon to report negative results in cases which should be positive according to all other tests.

Pat McDermott, laboratory technician at the Ohio State Penitentiary Hospital, has developed a technique which permits immediate use of sputum taken directly from the patient, eliminates the need for concentration, and colors the bacilli selectively so that they stand out sharply in the field beneath the lens.

The McDermott method consists of ten steps as follows:

1. The suspected particles of sputum are spread thickly and evenly on a slide;
2. The slide is dried in air;
3. It is then stained with carbol fuchsin and steamed for three to five minutes or soaked overnight;
4. It is decolorized in acid alcohol to a faint pink;
5. The slide is then covered with Solution A (2.5% solution of chloramine-T in distilled water) for thirty seconds;
6. Five or six drops of 10% acetic acid is next added to the Solution A on the slide and it is allowed to stand for thirty seconds;
7. A rinse of tap water is given the slide;
8. The slide is then covered for two minutes with Solution B (2.5 gm. chloramine-T and 10 gm. sodium bicarbonate to 100 cc. of distilled water);
9. It is then rinsed in tap water and dried without blotting or wiping;
10. It is ready for examination with the oil immersion lens.

A reliable comparison of the McDermott method with the Ziehl-Neelsen method can be made as follows:

1. Stain a sputum smear with the Ziehl-Neelsen technique;
2. Examine this slide using a thin oil for easy removal. Note the number of organisms per field;
3. Using the same slide, decolorize, and stain according to the McDermott technique;
4. Examine the slide and note the increased number of

organisms per field, as well as the increased ease of identification.

The McDermott method has been demonstrated to be superior to any other methods known to the authors, and is now the accepted technique in the Ohio State Penitentiary Hospital. It has been utilized experimentally in other hospitals in Columbus with promising results.

The precise mechanism which causes the McDermott method to give improved results is not known at this time. A contributing factor seems to be that the solutions used by McDermott dissolve the foreign matter on the slide, leaving the organisms well exposed in the field. Additional study, however, will be necessary to establish the exact reactions which take place in the process.

EDITORIAL

The 1947 Convention of the
AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS
in Retrospect

Fifteen years ago less than twenty five laboratory technicians who had their certificates from the Registry, met in Chicago and set out to organize a national society for medical technicians. This was followed by a year of laying the ground work for the present American Society of Medical Technologists. From that time on the annual conventions were held at the same time and place as the conventions of the American Medical Association and the American Society of Clinical Pathologists as a means of providing speakers and for the privilege of attending the scientific and commercial exhibits of the A.M.A.

Because of certain inherent obstacles which have arisen through the years in connection with the annual convention (one of which was the difficulty of having the chief technologist away from the laboratory at the same time as the pathologist), it was decided at the meeting in San Francisco in 1946 that tradition would be ignored and the next meeting would be held independently from those of any other medical groups. The invitation from the Colorado State Society of Medical Technologists to meet in Denver for the 1947 Convention was accepted.

It is indeed gratifying to note that the 1947 convention exceeded all previous ones in interest, in attendance, and in national representation. Five new state societies were affiliated during the past year and had their qualified delegates at the convention. Altogether, thirty two states were represented at the meeting of the House of Delegates.

The Colorado State Society of Medical Technologists distinguished itself by providing a most worthwhile and entertaining program, and by procuring excellent accommodations for those in attendance. Moreover, the magnificent support given to the scientific program by the faculty of the Medical School of the University of Colorado and by clinical pathologists and physicians from other midwestern medical centers shows and proves the faith these men have in our national organization.

At the luncheon on Tuesday, July 1, which commemorated the founding of the Board of Registry of Medical Technologists, it was a happy occasion to have Dr. Philip Hillkowitz, the first Chairman of the Board of Registry, and Mrs. Anna R. Scott, the first registrar, as special guests. Dr. Lall G. Montgomery, the present Chairman, was guest speaker. Another distinguished guest was Dr. Florence Sabin.

Of particular interest are the precedents set by the 1947 convention: 1. A state society can render outstanding service to the

national organization by sponsoring and handling the annual national convention.

2. A state society is in a better position to select the more outstanding individuals in medical technology in a particular locale than those from distances away, and by this fact, secure more and better speakers for a program.

3. An opportunity for meeting in many medical centers, new to this organization, is provided. Also, the means for obtaining a cross section of the practice of medical technology follows.

4. Conflicting convention dates are avoided, thus enhancing possibilities for larger attendance of our own members.

5. The quality and number of scientific and commercial exhibits on display in Denver, were ample proof that the act of meeting independently would be much in our favor.

The meritorious work done by the Colorado State Society of Medical Technologists in providing a convention of unprecedented excellence will long be remembered by those fortunate enough to be able to attend the meeting in Denver.

In 1948, the convention will be held in Minneapolis, Minnesota, with the Minnesota Society of Medical Technologists as host. Shall we have forty eight states represented, as well as the District of Columbia, and territories? The challenge is given you, Minnesota! —C. B.

IF (Apologies to Rudyard Kipling)*

If you can keep your head when all about you
are testing stools and splashing them on you.
If you can trust yourself when doctors doubt you,
but make allowance for their doubting too.
If in sticking veins you do not wax sadistic,
and treat the ailing patient as your friend.
If you can wield the cold and dry statistic,
and keep your sense of humor to the end.
If you can proudly practice your profession,
nor condescend, or lose the common touch.
If you can keep your brains in your possession,
and still resist the urge to talk too much.
If you can still be honest, cool and steady,
with orders piling up behind your back.
If you can get your day's reports all ready,
before it's time to quit and hit the sack.
If you can work twelve hours without cracking,
when eyes grow dim and nerves begin to throb,
Then I'm prepared to offer you my backing,
and what is more, I'll offer you a job.

—Alex M. Burgess, Jr., M. D.

* Part of the "After-dinner talk" by Dr. Burgess. Printed by popular request.

AMONG THE NEW BOOKS

RECENT ADVANCES IN CLINICAL PATHOLOGY, by various authors. Produced under the auspices of the European Association of Clinical Pathologists. S. C. Van Dyke, D. M. (Oxon), F.R.C.P., London, general editor. Philadelphia and Toronto. The Blakiston Company, 1947.

This book is one of the English *Recent Advance Series,* written by many authors who belong to the European Association of Clinical Pathologists. The entire book is intimately written and is intensely interesting all the way through. To quote the general editor: "The purpose of this volume is to make available in the form of a symposium some of the more recent additions to the practice of clinical pathology in Great Britain; its idea took shape at a meeting of the European Association of Clinical Pathologists—in July, 1944. It was their wish to place on record the present state in Great Britain of the knowledge and practice of clinical pathology." Moreover, it is very pleasant to note that Dr. Van Dyke, the general editor of this book, was at the time this book was written, President of the European Association of Clinical Pathologists.

There are four sections in this volume of 468 pages. Section I is devoted to Bacteriology under the editorship of Dr. Robert Cruickshank, Director, Central Public Health Laboratory, Colindale, London. There are thirteen chapters under the following titles: Laboratory Diagnosis of Enteric Infections, Laboratory Diagnosis of Typhus Fever, Laboratory Diagnosis of Sore Throat, Laboratory Diagnosis of Primary Atypical Pneumonia, Serological Classification of Streptococci, Laboratory Diagnosis of Pertussis, Laboratory Diagnosis of Brucella Infections, Laboratory Diagnosis of Anaerobic Infections, Laboratory Control of Pathogenic Staphylococci, Laboratory Control of Chemotherapy, Laboratory Diagnosis of Leptospiral Infections, Laboratory Tests in Venereal Disease.

Throughout this entire section one is amazed at the many little helpful hints which are given in the discussions. This note taken from the chapter on Sore Throat is of great importance: "Nor do nurses always realize how gargling or mouthwashing with antiseptic solutions before the swab is taken may hinder the growth of the offending microbe on the bacteriologist's media." Pertaining to diphtheriae cultures one reads: "What is the 'best' medium is at present largely a matter of personal opinion." The comment on gastric lavage for tubercle bacilli is

likewise timely: "Specimens must not be allowed to stand at room temperature for any length of time as the gastric juices may destroy the tubercle bacilli."

In this section one is definitely disappointed in the chapter on serology. Apparently the work of the United States Public Health department on the evaluation of various tests used in the diagnosis of syphilis is not recognized. The test given for the serological diagnosis of syphilis is the Hamilton-Peterson modification of the Laughlen test. The writer admits that the specificity is less than the Kahn, but recommends this as a screen test.

Section II is Biochemistry under the editorship of E. N. Allott. Chapters fourteen through twenty-one make up this section. These are: Liver Functions Tests, Estimation of Prothrombin Time, Control of the Blood Chemistry in Gastro-Intestinal Disease, Excretion Tests in Addison's Disease, Biochemical Aids in the Diagnosis of Nutritional Deficiencies, Crystalline Forms and Solubilities of Sulphonamide Derivatives, Photoelectric Colorimeters, and Micromethods of Blood Analysis.

One is definitely impressed with the excellence of the chapter on liver function tests. The new thymol turbidity test technic is included as well as the serum colloidal gold reaction and, Cephalin cholesterol flocculation test. One reads: "The laboratory is not a slot-machine, nor are liver tests a short cut to clinical diagnosis; but if regard is paid to these limitations and the tests are viewed against the clinical background, some will be of diagnostic value where the clinical diagnosis depends in part on the demonstration of hepatic damage in the laboratory."—"The crux of the problem is to separate 'medical' (hepato-cellular) from 'surgical' (extra-hepatic obstructive) jaundice, and this is more important than to make a specific diagnosis. A misdiagnosed 'medical' jaundice may be a surgical calamity,—. 'Cases of jaundice are rarely emergencies' and a period of study is useful." The above quote is indeed a challenge to all technologists to perfect their knowledge and proficiency in liver function tests, for these are undoubtedly coming to the fore more and more all the time.

The chapter on Nutritional Deficiencies includes a number of methods for determining the various vitamins. The chapter on Photoelectric Colorimeters is short but to the point.

Of great interest to the reviewer is the chapter on Micromethods for Blood Analysis. The eminent English biochemist, E. J. King, Professor of Chemical Pathology at the University of London is the co-author of Dr. Allott. Most of the technics given use only 0.2 ml. of blood—in the event that a small sample has been obtained, many a determination can be done which

otherwise would be impossible. Particularly significant is the manner in which the material is presented. The authors begin with Notes on Collection of Blood for Analysis and discuss briefly the choice of whole blood, serum or plasma; anticoagulants; avoidance of haemolysis; and avoidance of loss of blood gases. *Why* certain precautions are absolutely necessary is stated throughout this introduction. Thirteen methods are described. The principle, reagents required, method (procedure) and calculation are given for each. References are quoted. The Harding modification of the Schaeffer-Hartmann method using unlaked blood is the one which has been adapted for the micro determination of true glucose values; ammonium chloride is used as the source for nitrogen for the standards in urea and non-protein nitrogen determinations; a zinc sulphate filtrate is used in the determination of creatinine; cholesterol determinations are done with finger-tip blood; chlorides are estimated by the silver iodate method using sodium thiosulphate in the titration; phosphatases are done by the Gutman method.

The entire section is interesting for it is among the first contributions of micro-chemical technics to applied clinical pathology. Apparently these are finding more favor on the continent than here in America.

Section III is edited by Dr. B. L. Della Vida of Rome, Italy, and is entitled Haematology and Cytology. Chapters on the following subjects are presented: Haematological Nomenclature, The Myelogram and Its Clinical Applications, The Rh Factor, The Transfusion of Blood and Blood Products; Blood Grouping; The Sedimentation Rate of the Red Cells; The Diagnosis of Pernicious Anaemia and the Assay of Liver Extracts, Infectious Mononucleosis and the Differential Paul Bunnell Test, The Analysis of Semen, Carcinoma Cells in Sputum and Pleural Fluid.

The descriptions of the blood cells are good, but one is definitely disappointed in that there are no accompanying plates. The chapter on the Myelogram is a classic. The precautions cited for bone marrow counts under the title of, "Examination of the Specimen," should be a part of every technologist's armamentarium. Also, the chapter dealing with the Rh factor is excellent. Blood transfusion and its various problems are well presented. Of particular interest is the discussion of the sedimentation rate.

In most of the American texts the analysis of semen is grossly neglected; in fact, in quite a few of the top ranking texts no mention is even made of this subject whose importance is becoming more recognized as time passes. This book gives a complete survey of the problem, the methods used in establishing normality or abnormality of semen, and the criteria used in the evaluation of the semen analysis. This chapter is certainly one of the highlights of the book.

The chapter dealing with carcinoma cells in the sputum and pleural fluid contains much information on this ever growing and important subject.

Section IV is devoted to Histology, under the editorship of Dr. A. H. T. Robb-Smith, M.D., Director of Pathology, The Radcliffe Infirmary, Oxford, England. The following subjects are discussed: Aspiration Biopsy in General Tumor Diagnosis, Cell Counts in Serial Biopsies of Carcinomata, The Lymph Node Biopsy, The Testicular Biopsy, The Endometrial Biopsy, The Skin Biopsy, The Peripheral Nerve Biopsy, The Wet Film Technique in Neurosurgery, The Clinical and Post Mortem Pathology of Encephalitis, Routine Diagnostic Technique of the General Morbid Anatomist. In each of these chapters the technic is given for preparing slides from the various materials. As one reads through this section he feels that an appropriate title might be histological technic for the living—not the routine histological technic for surgical and post-mortem examinations. The procedure for obtaining a real biopsy specimen is given in the various chapters. The pitfalls and limitations are also enumerated. As one finishes the section, he is fully aware of the need for more histological examinations, and he feels a deep appreciation for the wonderful strides which have been made in this branch of clinical pathology.

In the opinion of the reviewer, this is a welcome edition. The style and format are typically English, but the style is as free and varied as there are different author contributors. This book is not a text, but a collections of reviews written for a symposium on modern applied clinical pathology. Even though written for pathologists, the little practical technic notes of the various authors make it a storehouse of practical information and medical technologists should find many helpful suggestions throughout the book.

AN INTRODUCTION TO BACTERIOLOGICAL CHEMISTRY by C. G. Anderson, Wellcome Physiological Research Laboratories, Langley Court, Beckenham, Kent, England, formerly Lewis Cameron Teaching Fellow, Bacteriology Department, University of Edinburgh. Second edition. 500 pages, 34 tables. Baltimore: The Williams and Wilkins Company, 1946.

This is a text written for students specializing in bacteriology and presents the chemistry of the metabolic processes and the chemical nature of bacteria and lower fungi. Although not directly related to medical technology, this book offers priceless background material for understanding the metabolic behavior of various organisms. The author assumes that the reader has a fair knowledge of chemistry and bacteriology.

The book is divided into three parts. Part I deals with Hydrogen Ion concentrations and pH; oxidation and reduction potentials, colloids and adsorption, enzymes, and the chemical composition of bacteria, yeasts and the lower fungi.

The discussion of buffers and indicators is excellent and well worth the time required for reading it. Colloid systems are explained, lyophobic and lyophilic colloids are differentiated, the importance of polar groups is stressed and, the main polar groups are mentioned and their strengths given. Enzymes and enzyme chemistry are briefly discussed. The chemical composition of bacteria, yeasts and lower fungi is discussed and a table is given which shows their variance.

One realizes the importance of bacterial nutrition, growth factors and adaptive constitutive enzymes in the role of bacterial growth as one proceeds with Part II. Chemotherapeutic drugs and antibiotics as destructive agents to bacteria are evaluated. Their chemical formulae are given when known. Bacterial respiration, nitrogen and carbohydrate metabolism alcoholic fermentations by bacteria, the fermentation products of the lower fungi, various industrial fermentation processes by bacteria, and the proteins, polysaccharides and lipoids of micro-organisms as well as pigment production by bacteria are discussed in Part II. The chemistry of all these various processes is given.

Part III takes up the chemistry of antigens, haptens, antibodies and complement and the mechanism of antigen-antibody reactions.

After finishing the book, one realizes in retrospect the very great importance of the chemistry of bacterial processes in the understanding of theoretical bacteriology. The *how* and *what* of bacterial accomplishments are definitely explained in this text.

The reviewer wishes to recommend this book to those who contemplate research or advanced study in bacteriology.

REPORTS FROM THE FIFTEENTH ANNUAL CONVENTION OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS, JUNE 30, JULY 1 AND 2, 1947

PRESIDENT'S ADDRESS*

By MARY F. EICHMAN, M.T. (A.S.C.P.)

In compliance with a tradition as old as our organization itself, it is a privilege to address you on the occasion of the Annual Meeting of the fifteenth year since our founding.

The responsibilities of leadership were greatly modified by the fine cooperation, prompt action, and sincere efforts of my fellow officers, Executive Secretary, Board, and Committee members—for which I thank them. Likewise, it has been evident that numerous individual members have made their contributions to our common cause. I believe I am justified in reporting a renewed all-out effort to support the principles and purposes laid down by our founders thereby to be of greater service to the membership and to achieve greater recognition for our profession through the medium of the American Society of Medical Technologists.

As is customary, the various officers, Board Members, and Committeemen will report in detail to the membership at the House of Delegates Meeting, therefore, at this time, I shall very briefly review the matters of general interest.

At this date, we can not claim that our membership record is one of complete enrollment of all eligible medical technologists. However, one may interpret the addition of 719 new members, within the period of 5-1-46 to 4-30-47, as some measure of accomplishment.

Relevant to our constitution, one of the expressed purposes is to devise ways and means to accelerate growth of the membership at local, state and national levels. In support of this, the Board of Directors authorized the publishing of the Second Edition of the Information Pamphlet and subsequent mailing to all registered medical technologists except American Society members.

Distribution in this way contacted approximately 8,200 potential members. Another avenue of distribution has been through the state society meetings and by Counsellors in their respective districts.

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* Delivered before the Annual Convention, June 30, 1947.

Through the courtesy of the Registry of Medical Technologists, our Information Pamphlet is sent to each new registrant at the date of his certification. In Dr. Montgomery's annual letter to all registrants, ASMT was favored by a paragraph, which stated the purposes of our existence, the benefits derived from membership therein, and an invitation to join our ranks.

Various members of the Board of Counsellors have reported to me successful strides in organizing and re-organizing state and local groups. In some instances, programmes have been launched for affiliation in the near future. Several other Counsellors deserve credit for achieving the affiliation of three state societies, namely, California, Michigan, and New Hampshire with the national.

Members of the Board of Directors deemed it advisable to appoint a Committee of Three, consisting of the Executive Secretary and two Board Members for the purpose of considering and approving disbursements of the $900.00 Committee Fund as provided by the Budget. Allocations from this Fund financed projects of the Educational Committee such as loan set materials, mailing and freight charges for the Information Pamphlet, travel expenses of Counsellors incurred in response to meet with groups interested in membership and affiliation, the reprints of Miss Lehman's article on Teaching Material which was sent to each approved training school, also the legal fee for the preparation of the amendments to the Articles of Incorporation and By-Laws.

The ROSTER included with the January Journal was unanimously favored by the Board Members and although printing costs have appreciably increased, I believe you will agree that the additional cost of the Roster is commensurate with the various purposes it serves. Our Editor has offered the suggestion of featuring Roster supplements in several issues of the Journal during the coming year and in this way defer the expenses of a complete Roster to every other year or so.

In the scope of this year's activities has been the preparation of proposed amendments to the Articles of Incorporation and By-Laws. In this respect, the Committee on Revision, after careful study and consideration of the recommendation and suggestions received from the membership, earnestly endeavored to compile a final draft which will be adequate for all present as well as future needs.

We recognize and appreciate the efforts of the Editorial Staff of our Journal in maintaining this most important means of communication between the administration and the membership at large and as a source of scientific knowledge applicable to our daily professional routine. The Journal indeed has been of

greatest assistance in implementing the plans of the Board and the committees.

All of the Convention Committees have functioned most willingly and have contributed their part in what I feel will be a successful convention.

May each of you enjoy, participate in, and be gratified for your efforts to attend the 1947 Convention. May each of us leave with a broad vision, renewed enthusiasm, and a strong determination to reach higher goals. Likewise let each of us assume "individual" responsibility as a duty to our profession which will be conspicuously exhibited throughout the new fiscal year.

ADDRESS OF WELCOME*

By E. R. MUGRAGE,
Advisor to the Colorado State Society of Medical Technologists, Univ. of Colorado, School of Medicine, Denver

When asked some months ago if I would give the welcoming address to this group, I was pleased to say, "yes."

There were several reasons for my affirmative answer, and these I will take up separately. Your society is holding this meeting for the first time independent of other organizations, out from under their shadow, to rise or fall on your own merits. You have come to Denver where twenty years ago the Board of Registry of the American Society of Clinical Pathologists was started. This was the stimulus for the formation of the American Society of Medical Technologists. Another anniversary should be mentioned, for in 1917, thirty years ago, the late Dr. James C. Todd whose book in one of its ten editions is universally known and used started the Department of Clinical Pathology in the University of Colorado School of Medicine on the Boulder Campus. And there is another anniversary date, for in 1897, fifty years ago, Dr. Frederic E. Sondern opened the first clinical laboratory in this country in New York City. With these early beginnings of medical technology in the memory of living man we can be proud of the progress which has been made in this allied field of medicine.

From the time the members of the Colorado Society of Medical Technologists learned that they were to be hosts for this Annual Meeting both committees and individuals have been busy, and they hope you will find the intellectual part stimulating and instructive and the entertainment to your liking. The members of the Colorado Society one and all want to do everything in their power to make this meeting a real success.

Many of you are attending these meetings with plans for spending some time afterward in this State. Colorado has much to offer with fifty-one peaks, fourteen thousand feet high and over for strenuous activity; horseback riding; or hiking in primitive areas; gorgeous scenery from good automobile roads; stream and lake fishing; wild flowers; or just basking in the bright sunshine under Colorado's blue sky. These and others await your pleasure.

The members of the Colorado Society of Medical Technologists and I welcome you and hope you have an enjoyable and profitable stay in our midst.

* Given before the first meeting of the Fifteenth Annual Convention of the American Society of Medical Technologists, Shirley-Savoy Hotel, Denver, June 30, 1947.

CONVENTION HIGHLIGHTS

Denver, Colorado, June 30, July 1-2, 1947

The fifteenth annual convention of the American Society of Medical Technologists, with a total registration of four hundred, three hundred and twenty seven of whom are members of the society, represented well what progress can be made through co-ordinated effort. A smoothly moving program, scientific and entertaining, proved the value of detailed planning.

Some forty two states, as well as Canada and Hawaii, were represented. The House of Delegates was made up of eighty one members, representing thirty two states and Canada. Miss Mary Eichman, president, announced at the first session of the meeting the key questions to come before the House of Delegates. The agenda of the meeting was read, as was the proposed budget, and the explanatory notes by the attorney who had advised in the compilation of the revised Constitution and By-laws. This enabled the members of the state groups present to meet with their authorized delegates who could reflect the combined opinions.

The members of the Board of Counsellors who were present or who were represented by proxies gave the following reports: Miss Ida Reilly, Southeastern States, reported the organization and affiliation of the Virginia Society of Medical Technologists, with the organization procedure begun in West Virginia, with their present activities in Charleston. Miss Mollie Hill reported that the Maryland and Washington, D. C., Societies had renewed activity, while letters were sent to members of the national society in Delaware in an attempt to assist in the organization of a state group. Miss Louise Vance announced the affiliation of the Michigan State Society, thus completing the organization of states in the Great Lakes District. Miss Bernice Elliott reported the continued activities of the Nebraska and Colorado Societies, with Wyoming still being unorganized. Miss Barbara Tucker, of the North Central States, was represented by Miss Marjorie Copenhauve, who reported that the Iowa technologists are interested in the formation of a state organization. The technologists of South Dakota met with the Public Health Association during the war, but hope to begin working independently in the immediate future. Miss Jeanne Jorgenson, of the Western States District, reported the organization and affiliation of the California State Society as a direct result of the last annual meeting of the A.S.M.T. in San Francisco in 1946. Utah technologists have expressed a desire to organize. From New England, Miss Lily Ford, represented by Mrs. Evelyn Jardine, reported the affiliation of the New Hampshire Society. The Massachusetts

Society title was given to the Worcester organization in an effort to have only state groups affiliated. Technologists in Rhode Island are interested in the formation of their state society. Miss Lucille Godelfer reported upon the activity of the Louisiana Society, together with no success in Mississippi and Florida. The report from the Southwestern States, Miss Estelle Boyd, Counsellor, was given by Miss Lucile Harris, to the effect that neither New Mexico nor Arizona technologists had responded to her letters. No reports were given by the counsellors from the South Central, North Atlantic, Southern, nor Northwestern States Counsellors. However, the affiliation of the Oregon State Society was reported by the Advisory Committee, thus bringing the total of new affiliates to five for the year.

The House of Delegates met in both an afternoon and an evening session. Article I, of the Constitution which was to the effect that our organization should be called the International Association of Medical Technologists, was defeated. We shall retain the organizational name, that of the American Society of Medical Technologists. In the discussion the point was brought out that should we relinquish our name as The American Society, other organizations would be free to assume it. In the report of the Committee on the revision of the Constitution and By-laws, the point was brought out that there could be no changes made in the Articles of Incorporation (Constitution) other than to delete any complete idea in an article. If there would be such deletion of word, clause, or sentence, there could not be an insertion at this time, of any word, clause, or sentence in its place. The next point in the Articles of Incorporation, was made in Article VIII, Section 1, on membership (See March, 1947, issue) from which the following was deleted: from page 92, line 50, after "(2)," delete the clause reading, "possess an academic degree from an accredited college at a baccalaureate level in medical technology or a baccalaureate degree in arts or science with a Major in Medical Technology."

The proposed revision of the By-laws was amended in Article III, Section 1. to the effect that on page 97, lines 41, 43, and 45, the word "September," was changed to read, "November" in each case, and on line 49, the word, "November," was changed to read, "January." There were other minor amendments to the By-laws which will be incorporated in the copy to be sent to each member.

Miss Vernal Johnson, chairman, Mrs. Evelyn Jardine, and Miss Sylvia Anderson were appointed as a Committee on Resolutions to incorporate into a report to be directed to the Registry of Medical Technologists of the American Society of Clinical

Pathologists, the recommendations of the Board of Directors of the A.S.M.T. to the effect that:

I. "Whereas, the American Society of Medical Technologists' representation on the Board of Registry of Medical Technologists of the A.S.C.P. is at present purely in an advisory capacity: and Whereas, all actions taken by said Board are of vital interest to the A.S.M.T.: Therefore, Be it resolved that: Full participating membership on the Board of Registry be accorded to the three delegates appointed from the A.S.M.T.

II. Whereas, we deem the present requirements for acceptance by the Board of Registry of Medical Technologists of the A.S.C.P. as an absolute minimum, therefore, Be it resolved that: No Junior Grades of Medical Technologists be established by said Board.

III. Whereas, conflicting and ambiguous interpretations have been received by members of the profession of medical technology; therefore,

Be it resolved that: 1. The Board of Registry of Medical Technologists of the A.S.C.P. retain the present Code of Ethics and interpret it literally, excepting the clause, "Or when employed by a physician, accept work outside of his own practice." 2. The term, "physician" be clarified. 3. The clause, "accept work outside of his own practice" be interpreted.

The Oklahoma Society of Medical Technologists presented resolutions which were directed to the Advisory Committee of Medical Technologists, to the Board of Registry, and to the Legislation Committee of the A.S.M.T.

The results of the election of officers were as follows: Miss Rachel Lehman, President-elect, Miss Ida Reilly, Recording Secretary, Mr. Oscar Stewart, Board of Directors, and Miss Jeanne Jorgenson, Board of Directors. The name of Miss Mary Eichman was deleted from the list of candidates for the position on the Board of Directors as the Immediate Past President automatically becomes a member of that body for a period of one year. The candidates for the position on the Advisory Board were not voted upon as that body was eliminated by the adoption of the revision of the Constitution and By-laws.

The Committee on Awards reported that the paper on "Penicillin and Streptomycin Sensitivity of Miscellaneous Bacteria and Fungi," by Lida Mattman, Ph.D., MT (ASCP), Santa Rosa Hospital, San Antonio, Texas, won the first Award of fifty dollars and the gold medal presented by the society. The second award, thirty dollars and the silver medal, was presented to Mrs. Hazel Suessenguth, B.S., MT (ASCP), Mt. Sinai Hospital, Cleveland, Ohio, for her paper on "Improved Antigen for the Slide Test on Trichinosis." Jack McKay, B.S., MT (ASCP),

Genito-Urinary Surgery, Bacteriology and Experimental Surgery, U. of Texas Medical School, Galveston, Texas, with his paper on "Genito-Urinary Infection, Bacteriologic Study of One Hundred Fifty Cases," was the recipient of the third award, consisting of fifteen dollars and the bronze medal. The award of $35 for the best scientific exhibit by an organization was won by the Minnesota Society of Medical Technologists, and Honorable Mention was given that of the Colorado Society. Mrs. Mable Stewart Miller, Denver, Colorado, received the $35 individual award for her exhibit on "Colorado Tick Fever."

The next annual convention will be held in the city of Minneapolis, Minnesota, at such time as is set by the committee on Local Arrangements and accepted by the Board of Directors.

During the fiscal year 1946-47, some 683 names were added to the roster of the A.S.M.T., bringing the total membership to 2511.

HOW WILL THE REVISED ARTICLES OF INCORPORATION AND BY-LAWS AFFECT ME AS A MEMBER OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS?

First, in order to be an active member of the A.S.M.T. (See Article VIII. Membership ARTICLES OF INCORPORATION) I must be a member in good standing of a subordinate society (a state, District of Columbia, territory of the United States, or of a foreign nation) which holds a charter from this society, and is itself in good standing. This means that if I live in a state where there is no organization of medical technologists, I will have to join with at least *two* other members of the AMERICAN SOCIETY in that state, and apply for a charter of affiliation with the national organization. In order to do this with a minimum of difficulty, I may write to Miss Jeanne Jorgenson, 900 Modoc Street, Berkeley 7, California, Chairman of the Membership Committee of the A.S.M.T., who will give us an outline of the correct procedure to follow in forming at least a small state (or other type of above-mentioned) organization. The A.S.M.T. does not want us to forfeit our membership and we will want to retain that membership. In an area where it is possible to have only a small numerical membership, our group may have to arrange to meet with another stronger organization (until such time as it is feasible to meet independently). We might arrange to meet with the state hospital association, or with the state public health association as a "laboratory section" for our scientific program, and as members of the "laboratory section," could have an annual business session during this same meeting.

As individual active members of the subordinate organization, we must comply with one or both of the following requirements: 1. we must be certified by the Board of Registry of Medical Technologists of the A.S.C.P. and/or 2. possess a degree at a master's level from an accredited college in any one of the six major fields of Medical Technology, vis: bio-chemistry, bacteriology, parasitology, histology, and serology and have one year of experience in a clinical laboratory approved by any member of the American Society of Clinical Pathologists. (The individual state societies may accept only registered medical technologists. If this is the case in your state organization, the "specialist" who has not a certificate from the Board of Registry cannot be an active member therein.)

In the procedure, therefore, specified for the continuation of my membership in the A.S.M.T., the two other persons, at least, shall follow the procedure set forth in Article XI of the Constitu-

tion, together with the information we reecive from Miss Jorgenson, and so form our "subordinate" society which will affiliate with the A.S.M.T. before July 1, 1948.

As a member of an affiliated society of medical technologists, I shall have the privilege of retaining my membership in any other affiliated organization in another state should I go to that place to work. This membership would be automatic and without further payment of dues for the fiscal year, provided I notify the Secretary of the state society from which I am transferring my residence. I shall have the same rights and privileges which I now enjoy. The only question which might arise in this regard would stem from those states which have only the certification by the Board of Registry as their criterion for membership, (some of the state organizations have not accepted to active membership the group of "specialists" who are not certified. That is the privilege of the state society.)

My annual dues will be in excess of five dollars per annum in such sum as the state society of which I am a member designates. I shall pay this state organization dues of five dollars plus, at such time as shall be designated by the state society. This will be at some time between July 1 and November 1. The treasurer of my state organization will then transmit my name, together with those of the other members of the state society, to the Executive Secretary of the A.S.M.T., as well as the check for a sum amounting to five dollars per capita. Thus I shall be listed as a member of both my state and national organizations. If I belong also to a local or district organization, I shall be privileged to pay dues to all three organizations at one time, thus saving myself the added bother of paying separate annual dues to each.

If, for some legitimate reason, I find myself unable to retain an active membership in my professional organizations, I have the right to submit a letter of resignation to the subordinate society (which will, in turn, take care of the procedure for the national society). Then, if I wish reinstatement, this can be done by payment of the current annual dues. If, however, I am merely careless about paying my dues, and allow myself to be dropped from the active rolls for non payment, I shall be penalized to the sum of dues in arrears, current dues, and a one dollar reinstatement fee as well as current annual dues.

The subordinate organization to which I belong will be represented at the meeting of the House of Delegates to the extent of one delegate for each twenty five members or fraction thereof, to a maximum of ten delegates. Besides these, the president of each subordinate organization automatically represents his so-

ciety in the House of Delegates, as well as on the Advisory Council.

The American Society of Medical Technologists will have more standing committees. The subordinate organizations will have these same committees and both groups will co-ordinate their activities. This form of organization will enable more activity to be instigated by local groups, rather than the central organization. This will make of our national society more of a co-ordinating body. The larger number of standing committees will broaden the scope of activity of state and national organizations.

Now, more than ever, will each of us have the opportunity to have a part in the progress of our profession. The state with numerical strength in medical technologists will have no more activity than that with only a few to band together. The fiscal year of 1947-48 will be one of reorganization. Much of the activity and procedures will be the same as in the past. Most of you will receive a bill for your annual dues for A.S.M.T. (for five dollars rather than four) from the Executive Office as in past years. Only a few of the states are situated at this time so that they can take care of this themselves (Minnesota and possibly Texas Societies of Medical Technologists). The process of reorganization may seem slow. Do not be impatient, but your active co-operation will be acceptable. The Membership Committee will be the "clearing house." If each of us does his part to fulfil the plan of organization of the A.S.M.T., we shall have a Society of Medical Technologists truly representative of our profession.

REPORT OF THE EDUCATION COMMITTEE—1946-47

The Education Committee of the American Society of Medical Technologists has performed the following services for the members of the organization during the past fiscal year: 1. It has been responsible for the allocation of the $1100 fund allowed by the Board of Registry for Seminars. To acquire a portion of this fund, it was necessary that the sponsoring organization fill in a required form. These forms were mailed to all organized societies, and the same information was given in the January, 1947, issue of the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY. The District of Columbia, Nebraska, California, Colorado, Wisconsin and Minnesota State Societies of Medical Technologists applied for, and received, sums totalling $441.50, thus leaving a sum of $658.50 which will be available until the Board of Registry meets in October, 1947. Allocations of money could not be made for those organizations which did not apply for such in the proper manner.

2. Dr. Seward Miller, of the U. S. Public Health Service, who had been with our society at the 1946 convention, was contacted in regard to parasitology courses, with the result that the announcement was made that the Public Health School in Atlanta, Georgia, would open its courses to our membership. Some thirty five members have received application blanks. A continuation of this privilege has been requested. For those unable to attend the course loan sets are available.

3. Dr. Conant, a leading Mycologist at Duke University, has been contacted in regard to possible refresher courses in that subject. This was met with the reply that a course for this year has already been started. We are asked to wait until next year.

4. Technologists in tropical countries have been contacted in regard to helping to make up loan sets in tropical diseases. The completion of this project will be slow as shipments from these places must be handled carefully and labeled to come into the United States duty free. Any payments are cared for by International Money Order.

5. Requests for blood smears from cases available to our members were responded to with the result that at least two excellent loan sets have been acquired.

6. Commercial firms were contacted for teaching films with the result that Armour's film, "Animated Hematology," Lilly's film showing the life cycle and the pathology of the amoebae, and the Wintrobe Company's film on, "Malaria," have been used by a number of organizations.

7. Hematology loan sets have been made available to our members through the Executive Office, Medical Center Bldg., Lafayette, Louisiana. A deposit of $20.00 is required, of which

$18.50 will be returned to the sender upon the safe return of the set to the office. The requests for a loan set may be made direct and promptness in acquiring same will be facilitated if the request is accompanied by the check for $20.00. A brief description of each slide accompanies each set. * Co-operation of the membership in making up still more hematology sets will be welcome. The isolated technologist who may not be able to attend a seminar or a convention will profit by this type of review.

8. Information regarding schools offering Master's Degrees in Medical Technology has been sought. It is hoped that in co-operation with the Board of Registry a questionnaire may be sent to all colleges inquiring about graduate work in Medical Technology.

9. Some 125 lists of approved training schools have been sent to college students and ex-service people who wish to enter the profession of medical technology. Departments of Public Instruction have been contacted and have been informed of the existence of approved training schools. Ex-service people have been encouraged to fulfill the requirements of the Registry for certification.

10. There has been a report on some phase of the work this committee has done in each issue of the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY during the past year, and the membership has been encouraged to participate in any of the activities which may interest them particularly. Some especially interesting type of case, in hematology, parasitology, bacteriology, etc., which might be "routine" in your laboratory, would be a valuable addition to another if you would make slides or specimens available to all through the Education Committee's loan sets.

11. The Paper-writing Contests were continued during the past year, and the following state societies participated: Minnesota, Pennsylvania, and Texas. The result was that some twelve papers were presented to the national Program Committee Chairman. Most of these will appear in the Journal during the coming year.

In all phases of the work of this committee, membership participation is necessary. The committee has put forth much effort, and with excellent results. There are high hopes that progress will be made during the coming year and that results will be even more tangible.

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* Dr. Heck of the Mayo Clinic, Dr. Kracke, and Dr. Queen, have assisted greatly in the making up of these loan sets through their timely advice and suggestions.

OKLAHOMA SOCIETY OF MEDICAL TECHNOLOGISTS

The Oklahoma Society of Medical Technologists was founded in the spring of 1937 with very few, but very staunch charter members. Since that time the group has shown a steady rise in membership, until we now have almost 100 members in good standing.

A complete history of the organization is not possible because, in an automobile accident a few years ago all our records were lost. However, the really important things are always retained, so our aims and policies continue as before.

The membership is composed of three classes: Active members, or those who are registered medical technologists; Associate members, or non-registered laboratory technicians; Student members, or those taking interneships in approved schools in preparation for application for registration. Associate members enjoy all privileges of membership except that they may not hold office, but student members participate only in the scientific portions of the Society's program. The majority of ours are active members, and we are encouraging our associate members to complete their requirements and become registered technologists.

We have had a 50% increase in total membership during this past year, and our membership in the American Society of Medical Technologists has similarly increased by 50%, the results of year-long membership campaigning. These two records we are proud to announce.

During the past year our executive committee held bi-monthly meetings. After every meeting, a letter was sent to each membr in which all businss accomplishments and all plans for future consideration were disclosed. Our members were thus kept informed of the workings of the Society, and were encouraged to take part by sending their opinions and suggestions to the committee. It is our aim to continue this procedure and to see these letters develop into the stature and dignity of true Bulletins. At present our one bulletin of the year is editor a month before the annual convention and carries the program and local arrangements of the convention.

Another activity of the past year was the establishing of a temporary fund for the purpose of collecting individual contributions to the Oklahoma Medical Research Foundation. The Foundation is a project of the alumni of the University of Oklahoma Medical School. They are going to build and maintain a grand new research center in Oklahoma, and rapid strides toward that goal are being made. What could be more natural than that the OSMT should wish to participate actively in such a creative and beneficial undertaking? A letter was sent to our members three weeks before our convention and the response

was prompt and generous. At the annual dinner, we presented to the Foundation a check for the purchase of a microscope (our professional emblem) to be used in hematological research. It was the first physical gift received by the Foundation as well as the first active participation by a group or organization. The members of OSMT were so gratified by this accomplishment that they established the Technologists' Research Fund as a permanent fund to which yearly pledges will be made, so that we may contribute at least one piece of laboratory equipment every year.

That action took place in a business meeting of our Eleventh Annual Convention of OSMT, which was held May 3 and 4, 1947, at the Biltmore Hotel in Oklahoma City, Oklahoma. Other business of interest was the passing of the resolution that ASMT be asked to formulate a model law to be used by the states as a guide in securing proper legislation for the licensing of medical technologists in those states desirous of such licensure, and a request for the ASMT to influence the Board of Registry to establish registration in special fields for those persons highly qualified in them. Other business was of local interest and need not take up space here.

The convention program was enthusiastically received by the 100 members attending and their guests. Our principal speaker was Dr. Israel Davidsohn, pathologist and director of laboratories at Mount Sinai Hospital in Chicago, Illinois. He spoke at the annual dinner on "Differential Diagnosis of Anemias" and again at a breakfast meeting of our Society with the Oklahoma Pathologists Association on "Determination and Interpretation of Anti-Rh Titers." Other features of the program were the reading of the two prize papers of our paper writing contest, and the discussion which followed: "Information, Please,!" in which it was our aim not to "stump the experts," but rather to "pump" them. Between meetings, registrants enjoyed the twelve technical exhibits on display in the ante-room.

Announcement of the results in our annual election of officers was made at our dinner, and the following new leaders of OSMT were presented to the members and guests present: President, Mrs. Dorothy Foreman, Tahlequah City Hospital, Tahlequah, Oklahoma; Vice-President, Miss Zana Skidmore, 401 W. 4th Street, Tulsa, Oklahoma; Sec'y-Treasurer, Miss Lois Keith, University Hospital, Oklahoma City, Oklahoma; Corresponding Sec'y, Mrs. Ethel Savage, 1107 Medical Arts Bldg., Tulsa, Oklahoma. All our best wishes go with them for an increasingly successful 1947-48.

STATE AND LOCAL SOCIETIES

CALIFORNIA STATE SOCIETY OF MEDICAL TECHNOLOGISTS

Résumé of activities of the past year: The activities during the past year have been chiefly confined to organizational work. The society is the outgrowth of the interest shown by California members of the American Society of Medical Technologists who attended the national meeting in San Francisco, June, 1946. This group elected by mail the following officers for 1946-47: President, Jeanne Jorgenson, Berkley; President-elect, Jean Lawrence, Palo Alto; Secretary, Genevieve Walters, Santa Monica; Treasurer, Amelia Mary Clark, Santa Monica.

This functioning nucleus planned a state-wide meeting which was held in Santa Monica on May 2 and 3, 1947. This was primarily a business meeting, but several interesting speakers were also featured. Articles of Incorporation and By-Laws were drawn up and accepted. Plans for local chapters were discussed, and delegates to the national convention in Denver were selected. The following officers were elected for 1947-48:

President—Jean Lawrence, Palo Alto
President-elect—Martha Lee, Van Nuys
Secretary—Genevieve Walters, Santa Monica—1204 Ozone St.
Treasurer—Amelia Mary Clark, Santa Monica

The California State Society of Medical Technologists has, since the annual convention of the A.S.M.T. in San Francisco on June 25, 26 and 27, 1946, organized, complied with all requirements, and received a Charter (June 10, 1947) from the national organization.

DISTRICT OF COLUMBIA SOCIETY OF MEDICAL TECHNOLOGISTS

The Seminar program of the District of Columbia Society of Medical Technologists, on April 26, 1947, was as follows:

"Agglutination Tests for Rickettsial Diseases," by Charles C. Shepherd, National Institute of Health.

"Newer Methods in Serological Tests for Syphilis," Lt. R. Berlin, U. S. Naval Medical School.

"Proper Methods of Handling Stool Specimens in Amoebiasis," Eugene R. Whitmore, M.D., former Professor of Pathology and Parasitology, Georgetown University.

"Recent Advancements in Laboratory Aspects of Antibiotics," by Harold L. Hirsch, M.D., Clinical Instructor in Medicine, George Washington University, School of Medicine.

"Diseases of the Liver and Diagnostic Tests," Roger M. Choisser, M.D., Professor of Pathology, George Washington University, School of Medicine.

"Later Developments in Hematology," by Joseph J. Wallace, M.D., Internist, Yater Clinic.

ILLINOIS SOCIETY OF CLINICAL LABORATORY TECHNICIANS

Officers, 1946-47:
President—Harriet Hall, 1007 Lehmann Bldg., Peoria
Secretary—Marian Cody, 508 Main Street, Peoria
Treasurer—Marie McCoy, 2700 West 69th St., Chicago

LOUISIANA STATE SOCIETY OF MEDICAL TECHNOLOGISTS

The third annual convention of the Louisiana State Society of Medical Technologists was held in New Orleans with headquarters at Hotel Monteleone, on May 2, 3, and 4, 1947. Miss Hazel Newton, Baptist Hospital, New Orleans, served as Convention Chairman. The convention opened with a Seminar at Charity Hospital on Friday evening where Dr. Albert L. McQuown gave a "Demonstration of Laboratory Diagnosis and Differentiation of Pathogenic and Non-pathogenic Fungi."

Miss Ruth Mayne, M.S., M.T., New Orleans, was the recipient of the award for the best paper presented by a medical technologist at the scientific meeting on Saturday. This paper, "Identification of Monilia Species," was well presented and illustrated with the use of lantern slides. Other papers presented were as follows: "From Superstition to Medical Technology in India," by Ruth Corpron, M.S., M.T., New Orleans; "Isopore Hominis," by Catherine Goetz, M.S., M.T., New Orleans; "Laboratory Diagnosis of Salmonellosis and Shigellosis," by James Watt, M.D., U.S. P.H.S.; "Observations Concerning the Failure of the Average Laboratory Worker to Isolate and Identify the Enteric Organisms," by William J. Noble, B.S., M.T., Shreveport; "Complement Fixation Tests, by George H. Hauser, M.D., Director, Division of Laboratories, Louisiana State Department of Health, New Orleans.

Dr. Waldo L. Treuting, President of the Louisiana State Board of Health, gave the address of welcome, to which Miss Hermine Tate, Lafayette, gave the response. The main points of business transacted at the meeting were as follows: Decision in favor of holding a seminar in October in New Orleans, with invitation to be extended to Medical Technologists in the three adjoining states; appointment of a committee to study and to present to the Executive Committee, a revised Constitution and By-Laws to conform with changes made by the A.S.M.T.

Dr. O. W. Bethea gave the address at the annual banquet on the subject of "Functional Nervous Disorders, Hysteria and Neurasthenia." At the banquet Miss Mayne was presented the award for her paper by Dr. Emma Moss.

Officers and Board Members elected to serve for the year 1947-48 are:

President—Mrs. Ineze Jordan, B.S., M.T., Alexandria, La.
President-elect—Miss Hazel Newton, M.T., New Orleans, La.
Secretary—Miss Dorothy Dickinson, M.A., M.T., Alexandria, La.
Treasurer—Mrs. Rosabel Shavin, M.T., Shreveport, La.
Executive Board Members—Miss Lucille Godelfer, B.A., M.T., New Orleans, La; Mr. David J. Stell, M.T., Lafayette, La.; Miss Hermine Tate, M.T., Lafayette, La.; Miss Joy Holm, M.T., New Orleans
Advisory Board Members: W R. Mathews, M.D., Shreveport, La.
Edwin H. Lawson, M.D., New Orleans, La.
S. H. Colvin, Jr, M.D, New Orleans, La.

MARYLAND ASSOCIATION OF MEDICAL TECHNOLOGISTS

After a lapse of eight years, the Maryland Association of Medical Technologists held its first reorganization meeting at Mercy Hospital on April 16, 1947. Miss Mollie Hill District Counsellor for the A.S.M.T., guided the proceedings, and Miss Mary Eichman, president, and Mrs. Lucille Wallace, president-elect, of the A.S.M.T, were present. The association is looking forward to a spirited and progressive future under the leadership of the following officers for 1947-48:

President—Miss Betsy Schmitz
Vice President—Mrs. Florence Levin Singer
Recording Secretary—Miss Miriam Walsh
Corresponding Secretary—Mrs. Norma Feik McElvain, 3608 Tenth Steet, Baltimore 25, Maryland
Treasurer—Mrs. Nancy Keener Menzel
Board of Directors—Sister M. Claude Rader, Mrs. Kathryn Dean.
Advisory Board—Dr. C. Wilbur Stewart, District Counsellor for the A.S.C.P.

MICHIGAN SOCIETY OF MEDICAL TECHNOLOGISTS

The Michigan Society of Medical Technologists held its first annual meeting at the Ferguson-Droste-Ferguson Hospital, Grand Rapids, on May 17, 1947. The scientific program was composed of the two following papers: "Bacteriological Examination for Salmonella and Shigella," by Dr. Grace Eldering, Michigan Department of Health Laboratories, Grand Rapids, and "What's New in Serology," by Dr. Elizabeth Yagle, Henry Ford Hospital, Detroit. The Michigan State College is presenting a refresher course in bio-chemistry to members of the society during the week of July 7-12. The following officers were elected for the year 1947-48:

President—Miss Edna Luneke, 72 Sheldon Ave., Grand Rapids
Vice President—Miss Marjorie Kenyon, Kalamazoo
Treasurer—Miss Helen Psik, Jackson
Corresponding Secretary—Mrs. Esther Goodson, 148 Oakes St., S. E., Grand Rapids
Recording Secretary—Miss Gladys Jacobs, 212 Garfield St., Bay City
Executive Committee—Miss Katherine Trimble, Lansing; Miss Eleanor Duffy, Detroit

Advisory Board—Dr. Hazel Prentice, Kalamazoo; Dr. Lynn A. Ferguson, Grand Rapids; Dr. S. E. Gould, Eloise.

THE MINNESOTA SOCIETY OF MEDICAL TECHNOLOGISTS

The Minnesota Society of Medical Technologists held its annual meeting with the Minnesota Hospital Association May 15, 16, and 17. The first two days of the Convention were devoted to a Symposium on the Rh Factor held at the Continuation Center of the University of Minnesota under the direction of Dr. William O'Brien. Dr. Edith Potter from Chicago was a leading guest speaker. Dr. Marwin of the University Hospital and Dr. Kouchy of St. Mary's Hospital, Minneapolis, correlated related subjects and phases of the Rh Factor problem. Technologists from the adjoining states of North and South Dakota and Iowa were invited as guests, and their tuition was paid through the Board of Registry of the American Society of Clinical Pathologists.

On Saturday, May 17, the annual business meeting was held at the Radisson Hotel. After the close of the meeting there was a judging of the Exhibit Contest by William O'Brien, M.D., A. J. Hertzog, M.D., and G. T. Evans, M.D. This Exhibit Contest was open to all hospitals, clinics, and districts to compete in a display of scientific demonstrations either practical or research, posters, or modifications of equipment to be used for specific laboratory procedures. A. S. Aloe and Company were very cooperative in the stimulation of the Exhibit Contest and offered three prizes. The winners and prizes are listed below:

First prize—Laboratory stool—Central District of Minnesota.

Second prize—Triple beam balance—Northwestern Hospital, Minneapolis.

Third prize—Interval timer—Miller Hospital, Duluth.

Honorable mention: Veteran's Hospital, Minneapolis; St. Mary's Hospital, Duluth; Swedish Hospital, Minneapolis; Miller Hospital, St. Paul.

Saturday noon the Minnesota Society of Medical Technologists joined the Minnesota Hospital Association for a luncheon for all allied groups, and the afternoon was devoted to a panel discussion between all allied groups, and a reading of the MSMT prize winning contest papers. A Minnesota Hospital Association banquet and dance at the Radisson completed a very successful convention.

Below are the results of the paper-writing contest:

First prize—"Rh Studies," by Sr. M. Emerita, St. Gabriel's Hospital, Little Falls.

Second prize—"Will O'Wisp in the Laboratory," (Bence Jones Protein), by Sr. M. Thecla, St. Mary's Hospital, Duluth.

Third (honorable mention): "Poliomyelitis Convalescent Throat Flora," by students of College of St. Scholastica, Duluth, in collaboration with Sr. M. Alcuin.

Officers for 1947-48 are as follows:
President—Miss Jane Maghan, St. Luke's Hospital, Duluth
President-elect—Miss Barbara Tucker, Minneapolis
Vice President—Miss Mary J. Buckman, Oak Terrace
Secretary—Sr. M. Emerita, Little Falls
Treasurer—Miss Donna Keller, St. Paul
Board of Directors—Catherine Hanitch, Oak Terrace; Emma Munns, Minneapolis; Sr. M. Michael, St. Cloud.

NEBRASKA SOCIETY OF MEDICAL TECHNOLOGISTS

The annual convention of the Nebraska Society of Medical Technologists was held at the Fontanelle Hotel, Omaha, on April 19, 1947, with the following scientific program: "Chemical Procedures," by Dr. Violet Wilder, Biochemist, University of Nebraska, College of Medicine, Omaha; "Methods in Parasitology," by Dr. George Underwood, Lincoln; "Bone Marrow," by Dr. Frank Tanner, Pathologist, Lincoln General and Bryan Memorial Hospitals, Lincoln; "Trends in Laboratory Service in Hospital Practice," by Dr. Edwin Hirsch, St. Luke's Hospital, Chicago.

The following officers were elected for the year 1947-48:
President-elect—Kathryn Forest, Omaha
Vice President—Ida Blore, Lincoln
Secretary—Selma Anderson, University of Nebraska, College of Dentistry, Lincoln 8
Treasurer—Inez Roesky, Omaha
Membership Chairman—Mary Gibb, Lincoln

PENNSYLVANIA SOCIETY OF MEDICAL TECHNOLOGISTS AND LABORATORY TECHNICIANS

Western Pennsylvania Chapter

Officers: 1947-48: President—Eleanor Stackhous.
President-elect—Helen Breen.
Corresponding Secretary—Elizabeth M. Heck, 958 North Fifth Street, Philadelphia 23.
Recording Secretary—Licia G. Gambescia.
Treasurer—Elizabeth Kauderer.
Advisory Board—Henrietta Lyle, Rose Antonucci, Doris Bradway, Elsa R. Lynch, Anne Caverly.

This organization held its first Seminar program on June 7, 1947, in Pittsburgh. On the program were such papers as "The Rh Factor," by P. C. Gaffney, M.D., Pathological Resident, St. Francis Hospital, Pittsburgh; "Antibiotics," by E. C. Reif, Phar. D., Dean and Professor of Pharmacology, Univ. of Pittsburgh, School of Pharmacy; "Diagnosis of Certain Virus Diseases," P. Walter Schlessinger, M.D., Assoc. Research Prof. in Pathology, Univ. of Pittsburgh, School of Medicine; "The Identification and Classification of Fungi Pathogenic to Man," by Anna Mary

Carpenter, Ph.D., Lecturer in Mycology, Univ. of Pittsburgh, School of Medicine; "Renal Disease—Classification and Laboratory Findings," by Paul Gross, M.D., Director of Laboratories, St. Joseph's Hospital, Pittsburgh; "The Appraisal of Industrial Health Hazards," by F. A. Holden, Chief Industrial Hygienist, Industrial Hygiene Foundation, Mellon Institute, Pittsburgh; "The Role of the Technician in the Practice of Allergy," by Leo H. Criep, M.D., Instructor at the Univ. of Pittsburgh, School of Medicine; "Demonstration of the Phase Microscope," by John Ungar, Jr., M.D., Pathologist at Sewickley Valley, Sewickley, and Tuberculosis League, Pittsburgh. At the fourth annual banquet, the Reverend L. C. Gobrecht, pastor of the Old Brick Church, Turtle Creek, spoke on the subject of "Confusion." One hundred medical technologists were registered at the meeting. There were guests from Ohio and West Virginia, as well as from Pennsylvania. The following officers were elected to serve the term 1947-48:

President—Miss Dorothy Flohr, 308 Lavina Ave., Pittsburgh 16.
President elect—Mr. Harry Langer, Canonsburg Hospital, Canonsburg.
Recording Secretary—Miss Angeline Caliquire, 710 Broadway, McKees Rocks
Corresponding Secretary—Mrs. Frances Jackson, 149 Parkfield St. Pittsburgh
Treasurer—Sister M. Salome, Braddock General Hospital, Braddock.

NIAGARA FRONTIER (New York) ASSOCIATION OF MEDICAL TECHNOLOGISTS

Officers for 1947-48 elected at the annual dinner on June 11, 1947, for the Niagara Frontier Association of Medical Technologists, were as follows:

President—Miss Alice Sprague, Buffalo General Hospital, Buffalo
President-elect—Miss Mary Frances Binisiciewcz, Deaconess Hospital, Buffalo
Recording Secretary—Miss Carmella Santomieri, Meyer Memorial Hospital, Buffalo
Corresponding Secretary—537 Delaware Ave., Buffalo
Treasurer—Miss Kay House, Millard Fillmore Hospital, Buffalo

OPPORTUNITIES

Instructor or assistant professor in pharmacology; eastern medical center. MT7-1.

Biological Chemist: Ph.D. with major in biochemistry and a minor in physiology or nutrition required; duties consist of directing nutrition and pharmacology research involving proteins and hormones; staff of six assistants. MT7-2.

Technician: Qualified in bacteriology; laboratory of large hospital located on West Coast; salary dependent upon qualifications but will be not less than $250 for a 40-hour week including noon meal and laundry or uniforms. MT7-3.

Two Chemistry Technicians: Duties of first position involve doing Kjildahl determinations of nitrogen for the study of nitrogen balance in connection with the naval study of convalescence; salary $2400; second position offers salary of $2200, will involve miscellaneous laboratory determinations, blood chemistry; both technicians will be expected to do Kjildahls; permanent; Middle Western university. MT7-4.

Technician: Department of pharmacology and therapeutics, Middle Western University; duties consist of making solutions and setting up apparatus for class experiments; research program involving usual biological procedures as well as special techniques; opportunities for formal training in pharmacology could be arranged after first year; salary dependent upon training and experience, probably range from $2400 to $3500, possibly more. MT7-5.

Biochemist: Assistant or associate professorship; duties consist of teaching medical students and serving as consultant to teaching hospital; should be under forty; university school; South. MT7-6.

Biochemist or Analytical Chemist: For research involving chemistry of milk and milk products; assistant to biochemist, research bacteriologist and, also, tissue technicians; department of research university having interesting long-range program. MT7-7.

Laboratory Technician: New 300-bed hospital operated under American auspices in industrial section in Poland; preferably technician interested in contributing to reconstruction of Poland. MT7-8.

Laboratory Technician: For interesting position in Africa; young man with some college work in biology preferred; modern, well-equipped hospital, comfortable living conditions; $300, transportation, living quarters; all recreational facilities. MT7-9.

Technician: Well qualified in laboratory work for interesting opening in office of obstetrician-gynecologist, Diplomate of American Board; Chicago area. MT7-10.

Laboratory Technician: Group clinic; staff of six well-qualified specialists; preferably one qualified to assume complete charge of small laboratory; $300 plus percentage; town of 40,000, Southern California. MT7-11.

Physicist or Physical Chemist: With some engineering training or experience; minimum of MS degree required, Ph.D. preferred; engineering research laboratories of large industrial company; primary assignment will be in connection with research in pigment dispersion and fine grinding. MT7-12.

Two Chemical Technicians: One hematologist and a blood bank technician who has had considerable experience with Rh typing; large teaching hospital; laboratory staff of 35 professionally trained personnel including three pathologists and four Ph.D's. MT7-13.

Technician or Assistant: Department of Physics, university hospital and clinic; preferably one who has majored in physics; duties consist of working in electroencephalography and optics. MT7-14.

Young Man to Teach courses in the field of botany including plant ecology, taxonomic botany, plant physiology; new department of forestry; master's degree required; permanent association; college enrollment 2400; town of 10,000; South; immediate. MT7-15.

Biochemist: To serve as assistant to pathologist, director of laboratories, fairly large hospital located in the vicinity of New York City; young man with Ph.D. or M.S. degree in biochemistry qualified to assume some of the administrative duties required. MT7-16.

Bacteriologist: Qualified to do penicillin and streptomycin assays in body fluids; research appointment; East. MT7-17.

Laboratory Technician: Particularly well qualified in blood work; 12-man clinic well established in the South; man preferred; minimum $3600. MT7-18.

Several Technicians: Both clinical laboratory and X-ray for positions on staff of hospital and clinic having important expansion program; several openings require degrees and several years' experience; opportunities also for technician well trained but without degrees; salaries for latter commence at $65 weekly, salaries for former dependent upon qualifications; West. MT7-19.

Well-Qualified Clinical Laboratory Technician: To join staff of laboratories connected with group-clinic and headed by prominent internist; Chicago area. MT7-20.

Two Technicians: To join staff of laboratories of relatively new hospital operated by one of the leading private practice groups of the country; staff of well-qualified specialists, most of whom are on the faculty of university medical school; one position requires special training in bacteriology, the other in chemistry; unusual opportunities. MT7-21.

Chief X-Ray Technician: To become associated with group-clinic planning expansion; present staff comprised of seventeen specialists, nearly all American Board men; town of 30,000 located in one of the Plateau states; minimum $250. MT7-22.

Technician Qualified in Microscopy, histology and photography of microscopic mounts, department of histology, research department, large industrial company. MT7-23.

Laboratory Technician: Particularly well trained in hematology or bacteriology; degree required; duties consist of teaching and supervising departments of hematology and bacteriology; no routine duties; 350-bed hospital having college affiliations; possibly of faculty appointment. MT7-24.

Two Medical Technologists or chemists, university graduates, for positions in clinical laboratories of large group; teaching center, Middle West. MT7-25.

Biochemist or analytical chemist for research involving chemistry of milk and milk products; assistant to biochemist research bacteriologist and, also, tissue technician, department of research, university having interesting long-range program. MT7-26.

Technician: Well qualified in hematology, another whose duties would be principally histology and a third to take charge of the Blood Bank; 350-bed hospital; town of 125,000; East. MT7-27.

Chief Bacteriologist: Large teaching hospital; duties consist of supervising clinical technical bacteriology; master's or bachelor's degree with fundamental training in medical bacteriology required; $3200-$3600. MT7-28.

Clinical Laboratory Technician: Well trained in bacteriological technique; modern, fully equipped hospital of 300 beds; full-time staff of well-qualified specialists; town of 40,000; Pacific Northwest; $250. MT7-29.

Tissue Technician: Laboratories of fairly large hospital directed by pathologist on part-time basis; must be able to assume considerable responsibility; $3000, Pacific Coast. MT7-30.

Chief Laboratory Technician: To take charge of laboratories; group clinic; staff of seven specialists all splendidly trained; college town of 40,000; Pacific Northwest; $300. MT7-31.

(In requesting information concerning these appointments, we shall appreciate your mentioning the key numbers.)

M. BURNEICE LARSON
Director, The Medical Bureau
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